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§ 2. Pod not constricted into separate joints, straight above, only slightly constricted below.

* Plant erect or accumbent, leaves dark-green, coriaceous, much reticulated.

38. MEIBOMIA INCANA (Swartz).
Hedysarum incanum, Sw. Fl. Ind. Occid. 1265 (1806).
Desmodium incanum, DC. Prodr. ii. 332 (1825).
Meibomia adscendens, var. *incana*, O. Kuntze, Rev. Gen. Plant. i. 195 (1891).
Distr.—Introduced into Florida.

** Plant low and spreading, loment ½′ or less long.

39 MEIBOMIA TRIFLORA (L.).
Hedysarum triflorum, Linn. Spec. Plant. 749 (1753).
Desmodium triflorum, DC. Prodr. ii. 334 (1825).
Meibomia triflora, O. Kuntze, Rev. Gen. Plant. i. 197 (1891).
Distr.—Introduced along the Florida coast.

The Fresh-water Algæ of Maine.—III.

(Plate CXXVI.)

BY F. L. HARVEY.

Since the second article upon the Algæ of Maine was written, we have occasionally examined gatherings in connection with laboratory work and below give the forms not before reported; also additional notes upon species before recorded. The most of the material came from Pushaw stream, near where it leaves the lake, and was attached to submerged sticks and stones. A rich gathering was also taken from a spring in a low meadow on the college farm. Accompanying this article is a plate illustrating some forms regarded as new, also other forms reported before as new and now figured. Other page and plate references are to Wolle's Fresh-water Algæ and Desmids of the U. S., the classification in those works being followed. We are again indebted to Mr. Wolle for suggestions and assistance. Unless otherwise credited the specimens were collected by the writer.

CLASS II.—CHLOROPHYCEÆ.

Family V.—Coleochætaceæ.

151. *Coleochæte soluta*, Pringsh., p. 64, Pl. LXXII.—Our specimens are similar to Fig. 3. in form, but sterile and only 11-15

μ d. With *Batrachospermum* in a ditch, above dam at Chemo stream. August 20, 1890.

Family VIII.—Confervaceæ.

152. *Chætophora pisiformis,* (Roth.) Ag., p. 116, Pl. CIII.—Associated with above and attached to *Batrachospermum.* Diameter of filaments in our own specimens 5-9 μ. Articulations 1-3 times as long as wide. Branchlets from 4-5 times as long as wide. Terminal cells more blunt than described by Wolle.

Family X.—Vaucheriaceæ.

153. *Vaucheria geminata.* (Vauch.) D.C., p. 151, Pl. CXXVIII.—Associated with the above. August, 20, 1890.

Family XII.—Volvocaceæ.

154. *Eudorina stagnale,* Wolle, p. 160, Pl. CLII.—Cœnobium 150 μ, containing only sixteen cells each 20 μ. Our specimen contained no green in the cytoplasm between the cells. Associated with diatoms, desmids and filamentous algæ in Pushaw stream.

155. *Gonium pectorale,* Mueller, p. 163, Pl. CLI.—Meadow spring on college farm, Orono, Me. Not abundant. October, 1891.

Family XIII.—Protococcaceæ.

156. *Scenedesmus dimorphus,* Kg., p. 173, Pl.CLVI.—Pushaw stream, October, 1890.

157. *Protococcus viridis,* var. *Wimmeri,* Wolle, p. 183, Pl. CLXI. Figs. 14-20.—Our specimens were dark green and measured 51 μ d. Pushaw stream among algæ. October, 1891.

Family XIV.—Palmellaceæ.

158. TETRASPORA MACROSPORA, n. sp.

Thallus membranaceous, with firm, gelatinous, transparent interior, small (about 1½ inches long), irregularly expanded and divided, verrucose, free, light green. Cells spherical or oblong, granular, geminate, quaternate or finally scattered, 5-16 μ d, 10-13 μ a common size.

Floating free in a spring on the college farm, Orono, Me. October, 1891. F. L. Harvey.

Fig. 1, geminate naked spore; fig. 2, quaternate spores attached; fig. 3, quaternate spores separated; figs. 4 and 5, large spores showing enclosed daughter cells, which are only sparingly found in the thallus; fig. 6, very large oblong spore, 20 by 30 μ, which showed motion; probably zoospore. The zoospores were sparingly scattered through the thallus, and the same color and of the same granular nature as the other spores. Our specimens harbored diatoms and infusoria but no filamentous algæ. The form of the thallus of this species is more like *T. expansa* (Kg.), Kirch, but the spores are larger and exceed those of all the species mentioned by Wolle, hence the name *T. macrospora.*

159. *Dimorphococcus cordatus*, Wolle, p. 199, Pl. CLX.—Among algæ, Pushaw stream. October, 1890.

160. APIOCYSTIS ELONGATA, n. sp.

Thallus obovate or narrowly pear-shaped, pale green, the cavity filled with gelatinous matter in which are imbedded the gonidia, at first about four and increasing with age. Length of thallus in the largest specimens 80 μ, and width 30 μ. The smaller forms were much more narrow in proportion to the length. Gonidia 7-11 μ. In the same gathering were free swimming zoospores about the size of the gonidia, and though we did not establish their relation to this species, presume they belonged to it.

We give several figures: Figs. 7 and 6, full grown thalli; figs. 8 and 10, younger forms observed; fig. 11, thallus budding. This seems to differ from *A. Brauniana*, Haeg., in the smaller more elongate form and larger gonidia. Spring pool, college farm. October 28, 1891. F. L. Harvey.

161. *Craterospermum lætevirens*, A. Br., p. 235, Pl. CL.

Mr. Wolle says on page 235 F. W. Algæ of the U. S., "that the only specimens recognized as possibly belonging to this genus were collected July, 1880, in Green Pond, N. J. The conjugation was complete, but the spores imperfectly developed, hence my hesitancy in calling it a pronounced species of this genus."

It will therefore be interesting to botanists to know that the writer has found this species in conjugation and with perfect zygospores in the Penobscot River at Orono, Me. The specimens were collected in a mill pond while the gates were open and the water very low. When the pond was full the plant must have been covered with two feet of water. We have made drawings of four fruiting filaments.. It will be noticed that the length of the neck between the filaments is quite variable.

In fig. 12 *a* and *b* the zygospores are spherical; in fig. 12 *c* barrel-shaped; in fig. 12 *d* the conjugation seems to have taken place between the end of one filament and the side of another. The conjugation does not always occur the same distance from the ends of the filaments. Our specimens were not so large as those shown by Wolle, the filaments being only 35 μ d. The zygospores were dark green and about 60 μ d. Some of the cells were fully twelve times as long as wide and others only four times as long. The plant mass was submerged and attached to sticks. Collected October 3, 1891. F. L. Harvey.

Family XVII.—Desmidieæ.

162. *Desmidium Baileyi* (Ralfs.) Wolle, p. 27, Pl. II. Our specimens not twisted. The excavations between the angles longer and narrower than in Wolle's figures, and the edges of the cells slightly concave. This may prove to be a new species. Pushaw stream, among algæ. October, 1890.

163. *Sphærozosma vertebratum* (Breb.) Ralfs., p. 30, Pl. IV.—Our specimens were from 15-20 μ wide and enveloped in a mucous sheath fully 60 μ wide. The cytoplasm was sometimes cruxiform in the cells. The filaments were apparently without twist. Attached to logs in the Penobscot River. October, 1890.

164. *Closterium subtile*, Breb., p. 158 (Appendix), Pl. VII. —Our specimens were sometimes 5 μ d. Swamp back of college woods, Orono, Me.

165. *C. attenuatum*, Ehrb., p. 41, Pl. VIII.—The ends in our specimens more attenuated than Wolle's figure. Frog pond, Orono, Me.

166. *C. moniliferum*, Ehrb., p. 45, Pl. VII.—Chloroplyllous granules large, fully one-third the diameter of the cell where they occur, and five in each half cell. Our specimens were about 47 x 306 μ. Spring, college meadow, Orono, Me. Oct., 1891.

167. *C. rostratum*, Ehrb., p. 46, Pl. VIII.—25 x 385 μ. Pushaw pond. Much longer than type. Probably new. Oct., 1890.

168. *C. Kuetzingii*, Breb., p. 47, Pl. VIII.—Specimens 17 x 460 μ. Pushaw stream. Oct., 1890.

169. *Docidium Baculum*, (Breb.), D. By., p. 49, Pl. XI.—Ends truncate, sides nearly parallel, vacuoles absent. The measurements 25 x 425 μ in our specimens. Spring in meadow, college farm. Oct , 1891.

170. *Cosmarium galeratum*, Nord., p. 70, Pl. XVI.—Spring, college meadow. Oct., 1891.

171. *Cosmarium protractum*, (Næg.), Archer., p. 83, Pl. XVII. —Meadow spring, college farm, Orono, Me. Oct., 1891.

172. *C. Beckei*, Wolle, —— Pl. L.—Our specimens only 1.5 μ d, and the cytoplasm collected in a ball. Meadow spring, college farm. Oct., 1891.

173. *Xanthidium armatum*, (Breb.) Ralfs, p. 92, Pl. XXI.—Spines shorter than figured by Wolle, but much like fig. 2 ; only 45-50 μ. Johny Mack Brook, Orono, Me. Oct. 1890.

174 *Euastrum Pokornyanum*, Grun., p. 104, Pl. XXVII.—Spring, college meadow, Orono, Me. Oct., 1891.

175. *E. pingue*, Elf., p. 105, Pl. XXVII.—With the above. Orono, Me. Oct., 1891.

176. *Micrasterias fimbriata*, Ralfs, forma, *nuda*, Wolle, p. 110, Pl. XXXVI., Fig. 4.—Our specimens 275 μ d. Pushaw stream, near the lake ; among algæ attached to submerged sticks. Oct., 1890.

177. *Staurastrum aviculum*, Breb., p. 123, Pl. XL., var. *brevispinum*, n. var., Pl. I., Fig. 13.—The type of this species was reported in Article I., No. 52, but since then we have found var. *brevispinum*, which differs from the type by being larger (35 μ d) ; the spines shorter and thicker, and the sides of the end view concave. None of the type form were found with this. Pushaw stream, among algæ. F. L. Harvey. Oct., 1890.

178. *S. polymorphum*, var. PENTAGONUM, n. var.

Broadly elliptical, sides tapering gradually into three processes tipped with spines ; end view pentagonal; angles blunt and tipped with three spines; diameter 48 μ. Sphagnum swamp, college farm. F. L. Harvey. 1890.

The more convex ends, larger size and pentogonal end view separate it from the type, with which we did not find it associated. See fig. 14, side view; fig. 15., end view.

179. *S. nanum*, Wolle, p. 138, Pl. XLIV.—Our specimens granulose punctate. Pushaw stream. Oct., 1891.

180. *S. Sebaldi*, var. QUARTERNUM, n. var. Distinguished from the type by absence of spines; smaller size (5 μ), broader appearance and quadrangular end view. Fig. 16 side view; fig. 17 end view. Pushaw stream. Oct., 1890. F. L. Harvey.

181. *S. Eustephanum* (Ehrb.), Ralfs, p. 147, Pl. XLVIII.—The peculiar form shown at fig. 7 is doubtfully referred to the above species. It was 55 μ broad including the spines, and enclosed in a hyaline sheath with a dentate border which was over 75 μ d. The cytoplasm of the included form was dark green, and the half cells not symmetrical, the smaller half cell having only three processes. Only one specimen observed. Sketched for the writer by F. P. Briggs. Pushaw stream. Oct., 1890.

182. *S. arctiscon*, Ehrb., var. CRENULATUM, n. var.—Somewhat smaller than type, half cells more rounded, processes thicker and with crenulate margins (fig. 18). Pushaw stream. Oct., 1890. F. L. Harvey.

Family XVI.—Conjugatæ.

183. SPIROGYRA ÆQUALIS, n. sp.

Diameter of vegetative filaments quite constant, about 45 μ; 5-10 times longer than broad; spiral single (rarely two), making usually 5 to 10 turns, though 6, 7, 8 and 9 were occasionally observed; end inlaid, chlorophyl of the bands coarsely granular with about six large nuclei to each turn. Sporiferous cells not swollen; same width and length as the vegetative, and often curved; conjugation lateral, zygospores elliptical or spherical; 40 x 40 μ, 45 x 45 μ, 45 x 75 μ and 45 x 105 μ were the dimensions observed. The spores were as wide as the filaments, extending to the walls, which were not inflated; scalariform conjugation not observed; lateral conjugation quite abundant; plant in mass, grass green and slippery, spores somewhat darker green; double and single spirals were observed in contiguous cells of the same filament.

Abundant in pools in a swamp on the college campus. Oct., 1891. Collected by F. L. Harvey. (Figs. 19-21).

The replicate ends of the cells, the single spiral, and the smooth membrane of the spores, puts the plant into the *S. tenuissima* section of Wolle. The only plant mentioned at all related to it is *S. Weberi*, Kg., with which it agrees in not having the fructiferous cells inflated, but from which it differs by the much greater diameter of the filaments, greater breadth in relation to the length of the cells, and the more compact spiral.

184. *S. longata* (Vauch.) Kg., p. 214, Pl. CXXXV.—Low ground pool. Orono, Me. Mr. Wilder Colby.

185. *S. dubia*, Kg., p. 220, Pl. CXXXV. Associated with the above. Mr. Wilder Colby.

CLASS III.—CYANOPHYCEÆ.

Family XVIII.—Nostocaceæ.

186. *Nostoc rupestre*, Kg., p. 283, Pl. CXCVII.—Reported from Houlton, Me., but since observed at Bradley, Me. Associated with *Vaucheria geminata* in Chemo stream. Aug., 1890.

187. *Chamæsiphon incrustans*, Grun., p. 295, Pl. CC.—Our specimens young; only 5 x 8 μ, and rounded above; attached to filamentous algæ singly and in clusters. Rather abundant. Spring, college meadow. Oct., 1891.

188. *Oscillaria natans*, Kg., p. 314, Pl. CCVI.—Filaments solitary; among algæ attached to sticks. Pushaw stream. Oct., 1890.

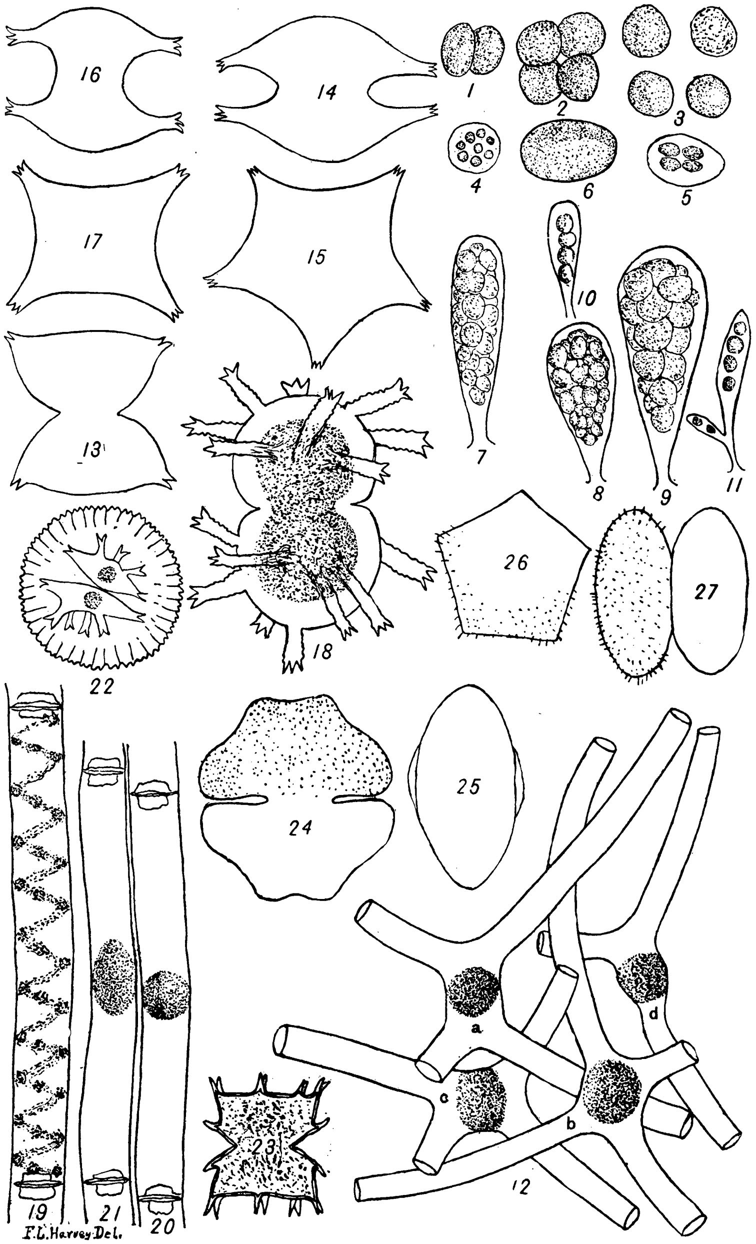
189. *Oscillaria princeps*, Vauch., p. 317, Pl. CCVII.—Our specimens bluish green; cells 5 to 1 in diameter; end cell rounded; clear and twice as long as the others; filament straight and not narrowing toward the end; 30 μ d. Pushaw stream among algæ. Oct., 1890.

190. *Merismopedia convoluta*, Breb., p. 326, Pl. CCX.—Our specimens bluish green; colonies 31 μ, attached to spruce logs floating in the Penobscot. Orono, Me. Oct., 1890.

EXPLANATION OF PLATE CXXVI.

Fig. 1. *Tetraspora macrospora*, geminate spore.
Figs. 2 and 3. *Tetraspora macrospora*, quaternate spores.
Figs. 4 and 5. *Tetraspora macrospora*, large spores with daughter cells.
Fig. 6. *Tetraspora macrospora*, large motile zoospore.
Figs. 7–9. *Apocystis elongata*, full grown Thalli.
Figs. 8–10. *Apocystis elongata*, younger forms observed.
Fig. 12. *Crateiospermum lætevirens;* *a* and *b*, spherical zygospores; *c*, barrel-shaped zygospores; *d*, abnormal conjugation.

BULLETIN OF THE TORREY BOTANICAL CLUB. Plate CXXVI.



FRESH-WATER ALGÆ OF MAINE. F. L. Harvey.

Fig. 13. *Staurastrum aviculum*, var. *brevispinum*, side view.
Figs. 14 and 15. *Staurastrum polymorphum*, var. *pentoganum*.
Figs. 16 and 17. *Staurastrum Sebaldi*, var. *quarternum*.
Fig. 18. *Staurastrum arctiscon*, var. *crenulatum*.
Fig. 19. *Spirogyra æqualis*, sterile filament.
Figs. 20 and 21. *Spirogyra æqualis*, fertile filaments.
Fig. 22. *Staurastrum eustephanum*, young encysted.
Fig. 23. *Xanthidium cristatum*, var. *truncatum*, Harvey. No. 122, Art. II., Me. Algæ, BULLETIN, Vol. XVI., p. 186.
Figs. 24 and 25. *Euastrum verrucosum*, var. *simplex*, Joshua. No. 46, Art. I., Me. Algæ, BULLETIN, June, 1888, p. 160.
Figs. 26 and 27. *Staurastrum saxonicum*, var. *pentagonum*, Harvey. No. 62, Art. I., Me. Algæ, BULLETIN, June, 1888, p. 161.

Sereno Watson.

BY WALTER DEANE.

Systematic botany has sustained a most serious loss in the recent death of Dr. Sereno Watson, Curator of the Harvard College Herbarium. It is always with a feeling of deep sorrow that we record the death of a man who has made himself famous by his eminence in science, but far deeper is our loss when, to his scientific attainments is added the kindly spirit which prompts the scholar to aid and encourage those seeking his assistance. Such was Dr. Watson. Reserved and retiring by nature, he rather shrank from society, and preferred to devote himself almost entirely to his own labors. But it was in the herbarium especially that his gentle nature and his readiness to help those about him were shown. He was never too busy to stop and ask a friendly question or give a courteous answer. How many times has he paused in his own work to help unravel some knotty problem put before him! But, to the botanical world at large, he will always be known as a master of systematic botany.

Dr. Watson was born at East Windsor Hill, Connecticut, December 1st, 1826. After graduating at Yale College in 1847, he taught school for six years in New England, Pennsylvania and New York, besides holding the position of tutor in Iowa University. A portion of this time he spent at East Windsor and at the University of New York in studying medicine. He continued his studies from 1853 to 1855, with his brother at Quincy, Illinois, where he practiced medicine for two years after. Though possessing a general interest in botany all this time, he